

TELEVISION STUDIO PLANT CONSIDERATIONS

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When Arthur Hungerford asked me to come here to speak to you on the problem of studio design, film facilities, remote facilities and the audio-video and lighting which go with the studio facilities, I asked him how many hours or days we might have for this discussion. His answer was that the presentation should last no longer than fifteen minutes and that there would be a question and answer period after the presentation.

To thoroughly explore this vast subject would require the better part of fifteen hours or fifteen weeks rather than fifteen minutes, however, I will try to get down to the basic elements that make up the minimum facilities for a television origination layout. In the early planning stages, equipment costs can be very rough, since it is easy to ascertain the approximate transmitter, tower and antenna costs, the approximate cost of the control room, studio, film, and remote equipment. Manufacturers' catalogues and price lists are adequate. Since the final prices are seldom lower than the estimated prices, we have a fairly firm foundation on which we can base the cost of our proposed operation.

Once we have determined the general operating plan and the approximate operating requirements, we should begin an investigation of the relations between the initial equipment cost and the operating cost of the proposed plant. Here personnel factors and equipment design become very important. A well thought out plant, designed to be operated, will be well and efficiently operated because personnel will enjoy operating. An operator does not object to being busy as long as he is able to do a good job without risk of disastrous consequences resulting from a minor error.

We should keep in mind in educational broadcasting that very often our operators will be part time personnel and that the turnover in our operating personnel will be very rapid, thus, every operating movement should be well thought out so that the station is easy to operate once it has been built. Careful study and planning and care taken in design will result in a more efficient and a better operated station with a minimum cost for equipment and personnel. Mistakes can be corrected before they happen by the proper arrangement of the operating area and we should employ the maximum experience possible in making the initial design and the final set-up of equipment adequate for the operation.

If possible, the one who is to be responsible for this operation should visit one or more operating stations that appear to have an operation similar to the one being planned. If there are educational stations in the area, then by all means we should visit an educational station. However, if that is not possible a commercial station can be visited and I am sure you will find a welcome there. The arrangements can be made through the equipment manufacturers, your consulting engineer or through your personal friends in an operating station. This should not be a visit, rather it should be considerable time spent sitting in the background, watching and listening to the operation, studying their equipment and their operating procedure and noting how much of their operation is performed with ease and confidence. Are the instructions which are given simple and easily understood? Watch and listen and, if possible, sit in the operating position and study the location of the controls, talk to the operating personnel during their breaks and lunch hours.

If you are able to watch television in your home, study the technical performance and the general flow of continuity during the station breaks and switchovers. Just looking at your home receiver can be a liberal education regarding the operation which you are about to undertake.

Since this is a discussion of studios and studio design, I would like to point out that television studios are just space which may be heated in winter and cooled in summer. There should be no fancy ornaments either inside or out, since the

building is a picture factory and sets will cover the walls and furniture will probably be different for each program. If possible, the transmitter space and office space should be contiguous to the studio. They should be comfortable, functional, easily cleaned, and simple in design. Wherever possible, the studio - transmitter building should be combined since economy of operation is of utmost importance.

Many of you will have architectural departments available to you to assist in the design of the studio space and it would be well if this architectural department were to concern itself with learning as much as possible about the design of modern studio space. However, in visiting many of the older AM operations, they will find considerable gingerbread and a lot of decoration which is not necessary and should not be considered in a television operation. We must remember that the older AM operations were pretty much of a bonanza type of concern and in many instances studio space was built to be very much of a show place. We should maintain that the studio space will be of the order of commercial storage or commercial warehouse construction with plenty of floor strength, with little decoration and preferably with the cinder block left bare on the inside walls. This is a very good acoustic treatment for the average television studio, the only other treatment which would be necessary would be that of the ceiling. If we use steel trusses or steel beams, we should leave them exposed in the studio. The thermal insulation should be put above the beams and a very cheap type of acoustic insulation between the trusses or beams, leaving the bottoms exposed for the attachment of lighting equipment and the top support of sets. This method of construction is economical and serves the purpose very well. It is being used in many commercial television installations at this time. Prefabricated buildings offering a minimum of cost for the steel plus the use of cinder block for the outside wall as well as the inside walls makes for very economical construction where we can get a maximum in square foot area for a minimum price. Construction costs will vary with location and on whether the job is union or non-union.

The cost per square foot of such construction will range from approximately five dollars to a little more than twelve dollars per square foot. The shell of the building without any interior finish and without lighting and heating, but including the floor, will generally vary between three and six dollars per square foot while the finished price will be approximately double this amount, as noted.

In some instances existing space may be available for conversion into a television studio area. When this is done, consideration must be given to remodeling costs while the operation is being planned. It is nearly impossible to move into any area without some cost for the modification of the area.

With regard to the technical equipment, which is a major item in the studio cost, we find that for an operation including film, live talent and some field operation (or at least the ability to operate in the field) the cost will vary from \$70,000 to \$100,000, depending upon the manufacturer, for the equipment necessary. If we desire only film operation and live talent, we will find that the cost will vary between \$60,000 and \$80,000 depending again upon the manufacturer and the specific pieces of equipment which are chosen.

In the first instance, the equipment included a microwave link for operation from a remote point back to the studio-transmitter location as well as a lighting allowance of \$5,000 as the minimum lighting requirement for one studio.

The division of equipment cost is approximately as follows: for a two camera field equipment including sync generator and switching, the cost would be approximately \$43,000. One motion picture TV camera pick-up costs approximately \$12,000. Two 16 mm projectors and a two inch by two inch slide projector will cost on the order of \$10,000. The audio control and input equipment will cost on the order of \$4,000 and the sync generator and studio switching equipment will be approximately \$10,000. We add to this the cost of the microwave equipment and some means of transportation and we find that with the variations in manufacturers we have an average cost, as I have stated, of between \$70,000 and \$100,000. If we eliminate the microwave equipment and the field sync generator, we find that we have reduced the overall cost and thus

have the ability to produce programs by film and by live talent at a cost for studio equipment on the order of \$60,000 to \$80,000 as noted.

If we consider that we should like to produce and record programs for distribution, then of course our equipment must include 16 mm sound on film equipment or recording equipment where we can record programs from the kinescope for distribution. These problems, I think, are both to be taken up in a later paper during this particular seminar.

Now there are all manners of variation in how equipment is procured, both as to the manufacturers who are to supply equipment as well as to the mixture of equipment between one manufacturer and another. At the present time negotiations with manufacturers appear to be favorable toward the educational broadcaster and most manufacturers are desirous of placing their equipment in educational institutions. Thus without negotiations the educational broadcaster will get a discount of ten percent on all equipment. With negotiation the offers on this equipment may occur at as much as a twenty percent variance from the list price. Manufacturers like to bid on equipment in most instances and bidding on equipment should be encouraged when it is purchased.

Much information can be obtained from the equipment manufacturer regarding the necessary equipment for a given layout providing the manufacturer is furnished with all information concerning the program potential and the desires of the particular educational operator. Being an engineer and having specified a number of stations over the past several years, I should like to encourage the use of experienced engineers and operating people in the specification of a new station. This means that after a budget is set up, within reason, the engineer who is to specify the equipment and aid in the design should be given a fairly free hand in the selection of the equipment which is required. In many instances competent help may be obtained from the engineering departments within the colleges themselves and this help with a minimum amount of consultation with experienced television design personnel can carry forward the construction of the proposed station in good order. If full cooperation can be

had from the engineering department and there is existent within the college a sizeable staff of those conversant with electronics and electronic procedures, the installation of the station can be done by part-time help under the supervision of an experienced engineer and thus there could be realized a considerable saving on the installation costs which I have not mentioned in this discussion. Installation in a new building which is prepared for television runs on the order of \$10,000 to \$15,000. In an installation of studio equipment in an old building where the modification to the building is considered a portion of the installation costs, we find that the installation costs may run as high as \$30,000 to \$50,000.

Please be aware of the fact that I am talking about a minimum operation for these various program potentials and that you should plan to expand this operation if it is needed in the future. Any television operation should be planned for expansion because, as we have found in every installation which has been built to date, expansion and change are the only two things constant about an operation. I do feel that, if proper cooperation can be had with the various units which are to provide programming for an educational television operation, then certainly as the years go on, we must plan for expansion and must leave extra space, at least on the ground, for the building of a second studio and the increasing of the size of the operation.

Study other operations, study other plans that are available, and particularly watch the early operators in educational television. To be sure mistakes will be made and problems will arise in any operation. You should be prepared to profit by the mistakes of others and to be willing always to take advice and weigh it against the operation that you are proposing. If there is one thing that television cannot stand, it is that we should be proud and not willing to profit by example. Television is an unweildy operation and a single mistake in the design of a plant can cost many many man hours and conceal an operating expense of many thousands of dollars before it is finally uprooted and corrected. Thus we need to be right the first time in the design of any plant regardless of size.

Plan for the operation at hand and plan carefully. Plan for an operation with inexperienced personnel. This means very careful planning with regard to equipment, equipment placement and the general mechanical operation of the plant which we are designing. Plan for expansion at minimum expense because if your operation is successful, expansion is inevitable. Never make any move until you are sure that the direction you are taking is the proper one because mistakes in the design of a plant can be costly as well as unwieldy and the expense of changes would much overshadow the cost of the initial expense in procuring the right kind of information in the design of the plant.

I will be glad to answer your questions insofar as I am able and within the time which we have allotted.

Thank you very much.

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